

REMARKS

I. Introduction

Applicants have reviewed the detailed Office Action mailed 10/16/01 (paper no. 9). Applicants have amended claims 1, 10, 11 and 13-19 and have cancelled claim 12. No new claims or matter have been added. Thus, claims 1, 10, 11 and 13-19 are pending. Applicants request reconsideration of the pending claims in view of the above amendments and the following remarks.

Entry of this Amendment is proper under 37 CFR §1.116 because this Amendment: (a) places the application in condition for allowance (for the reasons discussed herein); (b) does not raise any new issue requiring further search and/or consideration because the amendments amplify issues previously discussed throughout prosecution; and (c) places the application in better form for appeal, should appeal be necessary. This Amendment is necessary and was not earlier presented because it is made in response to arguments raised in the final rejection. Entry of this Amendment is thus respectfully requested.

By action taken here, Applicants in no way intend to surrender any range of equivalents beyond that needed to patentably distinguish the claimed invention as a whole over the prior art. Applicants expressly reserve all such equivalents that may fall in the range between Applicants' literal claim recitations and combinations taught or suggested by the prior art.

II. Objection to the Drawings

The Examiner objected to the drawings under 37 CFR 1.83(a) asserting that the drawings do not show every feature of the invention specified in the claims. More particularly, the Examiner requested that the means for monitoring the wheel brake pressure be included in the drawings. Claim 1 has been amended to remove this limitation rendering the objection moot.

Additionally, the Examiner requested that the counter device of claim 12 be included in the drawings. Applicants have cancelled claim 12 rendering the objection moot.

The Examiner also requested that the wheel brake pressure in the third mode of operation be shown in the drawings. Applicants include herewith a proposed FIG. 1

illustrating the wheel brake pressure in the third mode of operation. No new matter has been added. Withdrawal of the objection is respectfully requested.

III. Objection to the Claims

Claims 10-19 were objected to because of an informality. Applicants have amended line 1 of claims 10, 11 and 13-19 to recite "The method..." instead of "A method...." Withdrawal of the objection is respectfully requested

IV. Rejections under 35 U.S.C. § 112, first paragraph

The Examiner rejected claims 1 and 10-19 under 35 U.S.C. § 112, first paragraph, as containing subject matter that was not adequately described in the specification. More particularly, the Examiner asserted that the process of "monitoring the wheel brake pressure in the third mode of operation" as recited in claim 1 is not adequately supported in the specification. Applicants intended that the monitoring process comprise monitoring the master cylinder brake pressure, as supported by the specification and recited in amended claim 1. Therefore, withdrawal of the § 112, first paragraph, rejection with respect to claim 1 is respectfully requested.

Regarding claim 12, the Examiner asserted that the Applicants have not provided adequate support for the limitation of "a counter device." Applicants have cancelled claim 12 rendering the objection moot. Therefore, withdrawal of the § 112, first paragraph, rejection with respect to claim 12 is respectfully requested.

V. Rejections under 35 U.S.C. § 112, second paragraph

The Examiner rejected claim 14 under 35 U.S.C. §112, second paragraph, as being indefinite for reciting the phrase "monotonously declining" in claim 14. Claim 14 has been amended to depend from claim 15 to further define the way in which the excess elevation is declined. Therefore, withdrawal of the § 112, second paragraph, rejection with respect to claim 14 is respectfully requested.

VI. Rejection under 35 U.S.C. § 102(b)

The Examiner rejected claims 1, 10-14 and 17-19 under 35 U.S.C. § 102(b) as being anticipated by DE-19501760 to Pueschel et al. ("Pueschel"), which corresponds to U.S. Patent No. 5,727,852 to Pueschel et al. for column, line and figure numbers. For at least the following reasons, this rejection is respectfully traversed.

Regarding the Examiner's assertion that claim 1 is anticipated by Pueschel, firstly, nowhere does Pueschel teach or suggest diminishing the amount of excess elevation by controlling the wheel brake pressure as a function of the monitored master cylinder pressure throughout the duration of the third mode of operation, as recited by the Applicants in amended claim 1. Rather, as correctly indicated by the Examiner, Pueschel teaches diminishing the excess elevation as a function of time once the master cylinder pressure PHZ falls below a threshold value SB. *See Pueschel column 9, lines 36-40 and Fig. 8.* To further elaborate, unlike the Applicants' claimed invention, Pueschel does not teach controlling the wheel brake pressure as a function of the monitored master cylinder pressure throughout the duration of the third mode of operation. Instead, Pueschel teaches controlling the wheel brake pressure as a function of the monitored master cylinder pressure at the start of the third mode of operation and then reducing the wheel brake pressure as a function of time throughout the duration of the third mode of operation (i.e., from the point in time T3 until lines PRZ and PHZ unite).

Second, upon review of Fig. 8, Pueschel teaches away from the Applicants' claimed invention. To elaborate, during the third mode of operation in Pueschel, the master cylinder pressure PHZ decreases from the point in time T3 until it slightly increases prior to the end of the third mode of operation or the point where line PRZ and line PHZ unite. Because the wheel brake pressure in Pueschel is diminished according to a time dependent function, rather than as a function of the master cylinder pressure, the wheel brake pressure decreases even though the master cylinder pressure increases. Applicants determined that a diminution of wheel brake pressure according to a simple time dependent function yields the disadvantage that the behavior of the brake system goes beyond the driver's understanding. *See Specification, page 5, lines 29-32.* In other words, during the duration of the third mode of operation in Pueschel, the brake effect fades despite the driver keeping the pedal force constant or slightly increasing the pedal force, as illustrated by the increase in master cylinder

pressure PHZ after time T3.

Regarding claim 12, Applicants have cancelled the claim rendering the § 102(b) rejection moot with respect to claim 12.

Regarding claim 13, the Examiner asserted that it is inherent that the ratio of the wheel brake pressure and master cylinder pressure is equal to some time dependent constant of proportionality or momentary value. However, in the context of controlling the wheel brake pressure as a function of the master cylinder pressure during the duration of the third mode of operation, Applicants respectfully disagree. As evident in Fig. 8 of Pueschel, a momentary value of the wheel brake pressure PRZ is not determined by multiplying a momentary value of a time-dependent excess elevation function with the momentary value of the tandem master cylinder pressure PHZ during the portion of the third mode of operation where the master cylinder pressure PHZ increases.

For at least these reasons, claims 1, 13 and the claims that depend therefrom are allowable and Applicants respectfully request that the §102(b) rejection be withdrawn.

VII. Rejection under 35 U.S.C. § 103(a)

The Examiner rejected claims 15 and 16 under 35 U.S.C. § 103(a) as being unpatentable over Pueschel. For at least the following reasons, this rejection is respectfully traversed.

Regarding claim 15, the Examiner asserted that it would have been obvious to one of ordinary skill in the art at the time the invention was made to have included the step of declining the excess elevation function in time intervals in which the master cylinder pressure is declining by producing a larger decline in the wheel brake pressure. Similarly, regarding claim 16, the Examiner asserted that it would have been obvious to one of ordinary skill in the art at the time the invention was made to have included the step of keeping the excess elevation function constant in time intervals in which the master cylinder pressure is increasing. Applicants respectfully disagree.

First, the Applicants' claimed invention solves an unrecognized problem in the art at the time the invention was made, namely, the problem that a diminution of wheel brake pressure according to a simple time dependent function yields the disadvantage that the behavior of the brake system goes beyond the driver's understanding. This problem is solved

by Applicants' amended claim 1 and further defined by claims 15 and 16. For example, regarding claim 16, Applicants determined that keeping the excess elevation function constant in time intervals in which the master cylinder pressure is increasing prevents the problem of having the brake effect fade despite the driver keeping the pedal force constant or slightly increasing the pedal force.

Second, declining or maintaining constant the excess elevation function in time intervals in which the master cylinder pressure is declining or increasing, respectively, implies that the wheel brake pressure is determined as a function of the master cylinder pressure. However, as stated above, Pueschel teaches away from the Applicants claimed invention by diminishing the excess elevation according to a time dependent function, rather than as a function of the master cylinder pressure, during the duration of the third mode of operation.

Accordingly, it would not have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Pueschel to include the steps of claims 15 and 16. Applicants respectfully request that the §103(a) rejection be withdrawn.

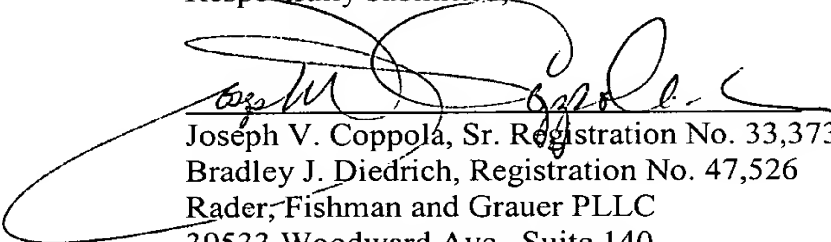
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VIII. Conclusion

For at least the above reasons, Applicants respectfully submit that the present invention, as claimed, is patentable over the prior art. If the Examiner has any issues that he believes can be expedited by a telephone conference, he is encouraged to telephone the undersigned representative at his earliest convenience.

It is believed that any additional fees due with respect to this paper have already been identified. However, if any additional fees are required in connection with the filing of this paper, permission is given to charge account number 18-0013 in the name of Rader, Fishman and Grauer PLLC.

Respectfully submitted,



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MARKED UP VERSION OF ALL AMENDED CLAIMS

1. (Once Amended) A method of operating a brake assistant system which comprises a first mode of operation in which the brake assist system is not actuated, a second mode of operation in which after recognition of an emergency brake situation a pressure build-up of wheel brakes is generated, and a third mode of operation which is provided for the transition from the second into the first mode of operation, comprising the steps of:

monitoring the [wheel brake] master cylinder pressure in the third mode of operation,
determining when the [monitored] wheel brake pressure is excessively elevated compared to the [tandem] monitored master cylinder pressure, and

diminishing the amount of excess elevation [in the course of time] by controlling the wheel brake pressure as a function of the monitored master cylinder pressure throughout the duration of the third mode of operation.

10. (Once Amended) [A] The method according to claim 1, wherein the excess elevation is a function of a driving situation and/or an input of a vehicle driver via the brake pedal.

11. (Once Amended) [A] The method according to claim 10, wherein the rate at which the excess elevation is diminished increases with a greater time duration and/or the intensity of a diminution of the brake pedal force.

13. (Once Amended) [A] The method according to claim 1, wherein the step of [monitoring] controlling the wheel brake pressure includes the sub step of determining a momentary value of the wheel brake pressure by multiplying a momentary value of a time-dependent excess elevation function with the momentary value of the [tandem] master cylinder pressure.

14. (Once Amended) [A] The method according to claim [13] 15, [further including] wherein the step of declining the excess elevation function comprises monotonously declining the excess elevation function as a function of time.

15. (Once Amended) [A] The method according to claim 13, further including the step of declining the excess elevation function in time intervals in which the [tandem] master cylinder pressure is declining.

16. (Once Amended) [A] The method according to claim 13, further including the step of keeping the excess elevation function constant in time intervals in which the [tandem] master cylinder pressure is increasing.

17. (Once Amended) [A] The method according to claim 13, wherein the momentary value of the excess elevation function is a function of a previous course of the [tandem] master cylinder pressure.

18. (Once Amended) [A] The method according to claim 13, further including the step of presetting a maximum value for the excess elevation function.

19. (Once Amended) [A] The method according to claim 13, further including the step of changing the brake assistant system from the third mode of operation into the first mode of operation when the excess elevation function substantially has a value equal to 1.

MARKED UP VERSION OF ALL AMENDED SPECIFICATION PARAGRAPHS

First Full Paragraph On Page 5:

In Fig. 1, a possible pressure course $p_{TMC}(t)$ of the tandem master cylinder pressure, substantially after the state “Total Pressure Build-up”, is schematically depicted. The tandem master cylinder pressure $p_{TMC}(t)$ is, due to the actuation of the brake assistant function, significantly smaller than the wheel brake pressure [(not depicted)] $p_{WHEEL}(t)$. The possible pressure course $p_{TMC}(t)$ schematically depicted in Fig. 1 is the result of an input by the driver by means of actuation of a brake pedal. In Fig. 1 can be seen that the tandem master cylinder pressure $p_{TMC}(t)$ is substantially constant between a point in time t_0 and t_1 . This means that $p_{TMC}'(t) = 0$ in the interval from t_0 to t_1 . Between the point in time t_1 and a point in time t_2 , the tandem master cylinder pressure decreases continuously. At the point in time t_2 , the tandem master cylinder pressure $p_{TMC}(t)$ reaches a minimum value $p_{TMC}(t_2)$. Between the point in time t_2 and a point in time t_3 , the tandem master cylinder pressure $p_{TMC}(t)$ increases continuously. At the point in time t_3 , the master cylinder pressure has a maximum value $p_{TMC}(t_3)$. Between the point in time t_3 and a point in time t_4 , the master cylinder pressure decays continuously. At the point in time t_4 , the tandem master cylinder pressure $p_{TMC}(t)$ has a minimum value $p_{TMC}(t_4)$. In this example, the master cylinder pressure rises anew as of the point in time t_4 .

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